

Convert the following angles to radians. Exact Values.

UNIT CIRCLE $\frac{\text{rad}}{\pi} = \frac{\text{deg}}{180}$

1) 60°

$\frac{\pi}{3}$

2) 45°

$\frac{\pi}{4}$

3) 270°

$\frac{3\pi}{2}$

4) 140°

$\frac{140}{180} = \frac{x}{\pi}$

$\frac{7}{9} = \frac{x}{\pi} \quad \left(\frac{\pi}{9}\right) = x$

Convert the following angles from radians to degrees. $\pi = 180^\circ$

5) $\frac{3\pi}{4}$

$\frac{3 \cdot 180}{4} = 135^\circ$

6) $\frac{5\pi}{3}$

$\frac{5 \cdot 180}{3} = 300^\circ$

7) $\frac{\pi}{2}$

$\frac{180}{2} = 90^\circ$

8) $\frac{7\pi}{6}$

$\frac{7 \cdot 180}{6} = 210^\circ$

Without using a calculator, give the exact value of each expression.

 $\sin \theta = y \quad \cos \theta = x \quad \tan \theta = \frac{y}{x}$

9) $\tan 60^\circ$

$\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right) \quad \frac{\sqrt{3}}{1} = \sqrt{3}$

10) $\cos 150^\circ$

$\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right) \quad \frac{-\sqrt{3}}{2}$

11) $\sin \frac{5\pi}{6}$

$\frac{1}{2}$

12) $\sin \frac{\pi}{4}$

$\frac{\sqrt{2}}{2}$

Give the reference angle of each of the following.

13) 352°

$\frac{360}{-352} = 8^\circ$

14) 160°

20°

15) -230°

$\frac{360}{-230} = 130^\circ$

16) 480°

120°

17) 48°

48°

Give the amplitude, period, horizontal shift, and vertical shift of each of the following. DO NOT GRAPH.

18) $y = 7 + 5 \cos 2\left(x - \frac{\pi}{4}\right)$

 \downarrow Amp \rightarrow horiz.
 \uparrow period

Amplitude 5

Period π $\frac{2\pi}{2}$

Horizontal shift $\frac{\pi}{4}$

Vertical shift 7

19) $9 + \sin 7\left(x + \frac{5\pi}{6}\right)$

Amplitude 1

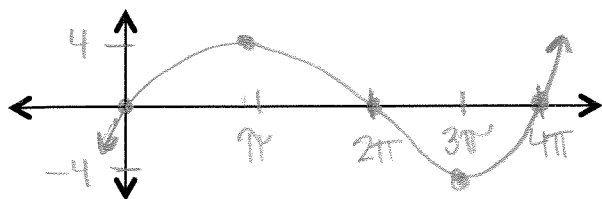
Period $\frac{2\pi}{7}$ $\frac{2\pi}{7}$

Horizontal shift $-\frac{5\pi}{6}$

Vertical shift 9

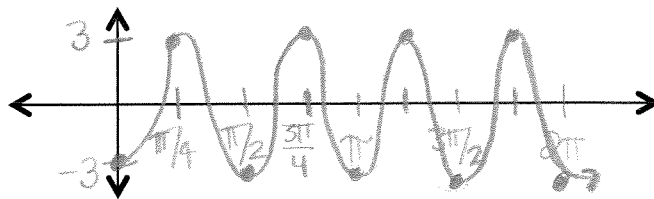
For each equation make a sketch of each graph. Be sure to label the axis.

20) $y = 4\sin \frac{1}{2}x$



21) $y = -3\cos(4x)$

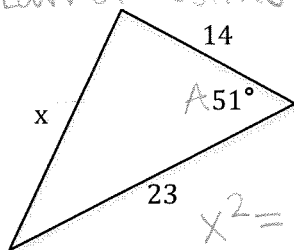
$\frac{360}{4} = 90^\circ$ 4 rotations



Find the value of x in each of the following triangles. If needed use: $a^2 = b^2 + c^2 - 2bc \cos A$

22)

Law of Cosines



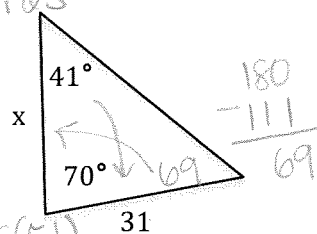
$$x^2 = 23^2 + 14^2 - 2(23)(14)\cos(51^\circ)$$

$$529 + 196 - 405.28$$

$x = 319.72$

23)

Law of Sines



$$\frac{\sin(41^\circ)}{31} = \frac{\sin(70^\circ)}{x}$$

$$x = 44$$

$x = 44.1$

Solve the following system of equations.

24)

$$x + y + z = 115$$

$$y = 2x + 5$$

$$x = 3z$$

$$y = 2(3z) + 5$$

$$y = 6z + 5$$

$$(3z) + (6z + 5) + z = 115$$

$$10z + 5 = 115$$

$$10z = 110$$

$$z = 11$$

$$x = 3z$$

$$x = 3 \cdot 11$$

$$x = 33$$

$$y = 2x + 5$$

$$y = 2 \cdot 33 + 5$$

$$y = 66 + 5$$

$$y = 71$$

Solve the following equations.

25) $\log_7(x - 4) = 2$

$$7^2 = x - 4$$

$$49 = x - 4$$

$$53 = x$$

26) $7 + (x + 5)^2 = 43$

$$(x + 5)^2 = 36$$

$$x + 5 = \pm \sqrt{36}$$

$$x + 5 = 6 \quad -6$$

$$-5 \quad -5 \quad -5$$

$$x = 1 \quad x = -11$$

27) $7^{x-3} = 145$

$$\log_7 145 = x - 3$$

$$2.55 = x - 3$$

$$5.55 = x$$